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**Report for the Stage 3 *ad-hoc* review of emission  
inventories submitted under the UNECE LRTAP  
Convention:**

**2023**

**LATVIA**

**FINAL REPORT**

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# INTRODUCTION

1. The mandate and overall objectives for the emission inventory review process under the LRTAP Convention is given by the UNECE document 'Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention'<sup>(1)</sup> – hereafter referred to as the 'Review Guidelines 2018'.

2. Paragraph 7 (c) of the 'Review Guidelines 2018' defines that Stage 3 Reviews may be annual centralized reviews or ad hoc reviews. Paragraph 18 of the 'Review Guidelines 2018' further specifies that such ad hoc reviews could, for instance, focus on specific source sectors, specific pollutants such as heavy metals or persistent organic pollutants, gridded and projections data, or on other areas as requested by the Implementation Committee and that where appropriate, ad hoc reviews could be conducted in line with the present Methods and Procedures for the In-depth (Stage 3) review.

3. At its eighth joint session in September 2022, the Steering Body and the Working Group on Effects approved the plan that the in-depth review in 2023 focuses on emissions from agriculture with a special emphasis on ammonia, NMVOC and NO<sub>x</sub> emissions including gridded data. While the focus was set on NH<sub>3</sub>, NMVOC and NO<sub>x</sub> emissions, also all other pollutants covered by LRTAP Convention and its protocols (i.e. SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, plus PM<sub>10</sub> PM<sub>2.5</sub>, BC, priority HMs and POP<sub>S</sub>) have been checked for the time series years 1990 – 2021 to the extent possible. For these other pollutants especially completeness of reporting was assessed.

4. This report covers the results of the Stage 3 Review (ad hoc review) 2023 of Latvia's air emission inventory submitted under the UNECE LRTAP Convention. The review was coordinated by the EMEP Centre on Emission Inventories and Projections (CEIP) acting as Review Secretariat. The review took place between April and June 2023 and was performed as a desk review between 31 March to 5 May 2023 and an in-person meeting between 22 of May 2023 and 26 May 2023 (centralized review). The following team of nominated experts from the Roster of Experts performed the review.

## **Agriculture experts:**

Ms. Armine ARTENYAN (Republic of Armenia)

Ms. Ajla BASOVIC (Montenegro)

Ms. Aleksandra NESTOROVSKA-KRSTESKA (North Macedonia)

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<sup>1</sup> Decision 2018/1 adopted by EB: *Updated methods and procedures for the technical review of air pollutant emission inventories reported under the Convention*. ECE/EB.AIR/142/Add.1  
[http://www.unece.org/fileadmin/DAM/env/documents/2002/eb/air/EB%20Decisions/Decision\\_2018\\_1.pdf](http://www.unece.org/fileadmin/DAM/env/documents/2002/eb/air/EB%20Decisions/Decision_2018_1.pdf)

Mr. Lasha AKHALAIA (Georgia)

Mr. Hakam AL-HANBALI (Sweden)

Ms. Susana LOPEZ-APARICIO (EU/ETC(EEA))

Ms. Simone MAYER (Austria)

Ms. Andjelka RADOSAVLJEVIC (Serbia)

Ms. Kristina Tonhauzer (Slovakia)

Mr. Tim VAN DER ZEE (Netherlands)

**Experts for gridded emission data:**

Ms. Christine BRENDLE (Austria)

Mr. Christopher EVANGELIDES (United Kingdom)

Mr. Christian MIELKE (Germany)

5. Mr. Ben RICHMOND (United Kingdom), Ms. Rikke ALBREKTSSEN (Denmark), Mr. Etienne MATHIAS (France), Ms. Kristina SAARINEN (Finland) were the lead reviewers. The review was coordinated by Ms. Sabine Schindlbacher and Mr. Bernhard Ullrich (EMEP Centre on Emission Inventories and Projections - CEIP).

6. The review was performed on basis of CLRTAP emission data officially reported by Latvia due by 15 February 2023. The Informative Inventory Reports (IIR), reported due by 15 March 2023 under the CLRTAP, informed the review.

7. The EMEP/EEA Guidebook 2019<sup>2</sup> was used as a base for the review.

8. The emission inventory of Latvia was received on 15 February 2023 and thus by the deadline of 15 February. The Informative Inventory Report was received on 15 March 2023 and thus by the deadline of 15 March. Latvia provided a resubmission of the emission inventory and the IIR on 27 April 2023. The resubmission has been considered for the review.

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<sup>2</sup> EMEP/EEA: EMEP/EEA Emission Inventory Guidebook 2019, EEA Report No. 13/2019 European Environment Agency, Copenhagen. Available at: <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019> EU 2019

## **PART A: GENERAL RECOMMENDATIONS FOR THE CHAPTER AGRICULTURE**

9. The ERT recognises the level of effort undertaken by Latvia in providing an inventory including a significant level of detail.

The IIR describes the methods used for the sector agriculture transparently enough. The ERT considers the agriculture part of the inventory submission to be of adequate quality in terms of completeness and of adequate quality in terms of accuracy, comparability and consistency.

To improve the overall quality of the agriculture air emission inventory the ERT recommends Latvia to

- provide a chapter on the status of implementation of CLRTAP stage 3 review (and if applicable for NECD review) recommendations as required in chapter 8.3 in Annex II of the Reporting Guidelines
- provide information on the progress in the implementation of pending recommendations with clear steps and a schedule as required in chapter 8.3 in Annex II of the Reporting Guidelines
- provide results from the conducted evaluation of the use of Tier 2 methodology for 1990-2004 to calculate NH<sub>3</sub> emissions from 3Da1 Inorganic N-fertilizers.
- apply a Tier 2 method for all key categories
- further develop the uncertainty analysis by developing country-specific parameters.
- provide transparent information on all recalculations
- provide more information on reasons behind fluctuations in the timeseries

## **PART B: SPECIFIC RECOMMENDATIONS FOR THE SECTOR AGRICULTURE**

10. Table 1 provides the findings from the 2023 CLRTAP Stage 3 Review including those not implemented from previous CLTRAP Stage 3 Reviews. While the focus was set on NH<sub>3</sub>, NMVOC and NO<sub>x</sub> emissions, also all other pollutants covered by the LRTAP Convention and its protocols (i.e. SO<sub>2</sub>, NO<sub>x</sub>, NMVOC, NH<sub>3</sub>, plus PM<sub>10</sub> PM<sub>2.5</sub>, BC, priority HMs and POP<sub>s</sub>) have been checked for the years 1990 – 2021 to the extent possible, especially regarding the completeness of reporting. The implementation of the recommendations will be followed up in a future CLRTAP inventory review.

**Table 1: Findings from the CLRTAP Stage 3 Review 2023 for the Sector Agriculture<sup>3</sup>**

ID	Pollutants	NFR category	Key Category	Tier level		Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia-2023-3D-1	NH <sub>3</sub>	3D1a	Yes	Tier 2		R	T
	<p><b>Observation</b>                      The ERT noted that information on fertilizer types for the period 2008-2011 provided during the previous review had not been included in the IIR while only 2021 activity data was presented. According to the IIR, data up to 2003 are confidential, however, no activity data after 2003 is provided. On the request of the ERT Latvia submitted the missing information on fertilizer types by Central Statistical Bureau especially for inventory purposes. This information is confidential as if is not published and has restricted access.</p> <p><b>Recommendation</b>                      The ERT recommends Latvia to include information on the confidentiality of the activity data in its next IIR submission.</p>						

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<sup>3</sup> Note: There are four possible types of findings: R: Recommendation, TC: Technical Correction, PTC: Potential Technical Correction; RE : Revised Estimate

The findings have been assigned to one or more of the following criteria: TACCC T (Transparency), A (Accuracy), C<sub>1</sub> (Completeness), C<sub>2</sub> (Comparability), C<sub>3</sub> (Consistency) for definitions of these criteria see EMEP/EEA Guidebook 20the19

ID	Pollutants	NFR category	Key Category	Tier level		Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia-2023-3D-2	NH <sub>3</sub>	3D1a	Yes	Tier 2		R	T
	<p><b>Observation</b> The ERT noted that in chapter 5.3.4 of the IIR a reference is made to EMEP/EEA 2016 Guidebook, however, the same EFs are presented in EMEP/EEA 2019 Guidebook. Latvia confirmed that they will change the reference to the 2019 Guidebook in the next submission.</p> <p><b>Recommendation</b> <b>The ERT recommends that Latvia correct the reference to the 2019 Guidebook in the next IIR.</b></p>						
ID	Pollutants	NFR category	Key Category	Tier level		Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia-2023-0-1	NH <sub>3</sub>	General-Uncertainty	/	/		R	A
	<p><b>Observation</b> In the previous review, the ERT recommended decreasing the uncertainty of the inventory by making further efforts to develop robust country-specific parameters. In the current IIR Latvia has reiterated the reference to IPPC 2006 and EMEP/EEA 2019 Guidebook regarding uncertainty analysis, and the lack of information about background data. In response to the question from the ERT Latvia stated that country specific values, guideline values or sector expert judgment are used, and that information on the uncertainty assessment is described in detail in the subchapters and in the general chapter.</p> <p><b>Recommendation:</b> <b>The ERT recommends the Party to continue the effort in reducing the uncertainty by developing country-specific parameters and to report on the progress in the next submissions.</b></p>						

ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia-2023-3I-1	NH <sub>3</sub>	3I	No	Tier 1	R	TA
	<p><b>Observation</b></p> <p>The ERT noted that in its IIR, chapter 5.4.8, Latvia refers to recalculations due to improvement of activity data but did not provide background information for this recalculation. In response to the question on the issue the Party explained that there were some minor recalculations for some years as more accurate data of the area of grassland burning was provided by the State Fire and Rescue Service (SFRS), but that no recalculations were made for category 3I in the 2023 submission. Latvia additionally explained that within the 2023 submission, no recalculations were made for category 3I and that the statement provided in chapter "5.4.8 Recalculations" regarding category 3I ("Recalculations are introduced due to improvement of activity data") was misleading (added due to a mistake). Latvia informed that this chapter will be updated according to the actual situation in the next submission.</p> <p><b>Recommendation</b></p> <p><b>The ERT recommends Latvia to correct the text in the IIR if no recalculations were performed in 2023 for this category and to clarify for which year activity data were improved and to include information given in the response regarding the reasons for these improvements.</b></p>					
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia-2023-3D-3	NH <sub>3</sub>	3Da2a	Yes	Tier 2	R	T
	<p><b>Observation</b></p> <p>The ERT identified a large dip in the activity data for 1995 presented on page 132 (Figure 5.4, chapter 5.3.5) of the IIR. To the question on the issue Latvia responded that the decline is related to the change in the structure of the country. Since 1991 when Latvia left the USSR, agricultural production collapsed and by 1995 the large collective farms were liquidated, and small private agricultural companies began to form. Over time, private companies developed, and agricultural production also began to develop more rapidly.</p>					



	<b>Recommendation</b> <b>The ERT recommends Latvia to include the given information on structural changes in the next IIR submission.</b>					
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia-2023-3D-4	NH <sub>3</sub>	3Da2b	No	Tier 1	R	T
	<p><b>Observation</b></p> <p>The ERT identified a higher use of other organic fertilizers in the period 2013-2016 with reference to page 133, Figure 5.6 in chapter 5.3.5 of the IIR. To the question on the issue the Party responded that data of organic fertilizers is provided by the Central Statistical Bureau based on observations, and that usually, fertilizer consumption is highly dependent on market situations and prices. The Party informed that additional information will be requested from the Central Statistical Bureau.</p> <p><b>Recommendation</b></p> <p><b>The ERT recommends Latvia to collect the lacking information and to include this and the information provided in the review in the IIR for the next submission.</b></p>					
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia - 2023-3B-1	NH <sub>3</sub>	3B	Yes	Tier 2	R	T/A
	<p><b>Observation</b></p> <p>The ERT noted with reference to the 2013 Stage 3 inventory review report, that the recommendations to describe in more detail the background for the expert judgement regarding national N ex values for dairy (Nex per milk yields) and derivation of the animal waste management distribution) and any plans to verify the expert judgements by collecting additional data, were not implemented. Latvia responded that they have started to implement this recommendation and work to gather country-specific data on abatement measures. The Party stated that the problem will be reviewed in a project carried out by Latvian University of Life Sciences and Technologies during this year. Latvia plans to conduct research on this issue in the subsidy project 'Greenhouse gas effects of Latvian agriculture evaluated by abatement cost curves (MACC) for agriculture's progress towards decarbonisation'. However, the Party responded that it would need additional time to verify the expert judgement.</p>					

	<b>Recommendation</b> The ERT encourages Latvia to fully implement the previous recommendation and to provide information on the progress made in its next IIR.					
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia 2023-3F-1	NH <sub>3</sub>	3F	No	Tier 1	R	T
	<p><b>Observation</b></p> <p>The ERT noted that for 3F - Field burning, the notation key “NO” is reported, however, no reference to the national/international legislation and the year when this legislation entered into force was provided. Latvia responded that legislative measures and agricultural residue management practices prohibit field burning of agricultural residues, as stated in the Administrative Violations Code Section 179 Violation of Fire Safety Regulations but did not provide the year when this regulation entered into force. Latvia provided additional information that the Latvian Administrative Violations Code entered into force on 01.07.1985.</p> <p><b>Recommendation</b></p> <p>The ERT recommends that Latvia include the given information in the IIR with the reference year in the next IIR submission.</p>					
ID	Pollutants	NFR category	Key Category	Tier level	Type	TAC <sub>1</sub> C <sub>2</sub> C <sub>3</sub>
Latvia 2023-3D-3	NMVOG	3De	Yes	Tier 1	R	AC1
	<p><b>Observation</b></p> <p>The ERT noted that category 3De Cultivated crops is a key category for NMVOG emissions. However, Latvia in its 2023 submission uses a Tier 1 methodology. In line with Reporting Guidelines paragraph 21 Parties should make every effort to use a Tier 2 or higher (detailed) methodology, including country-specific information for key categories. Latvia responded that country-specific data for NMVOG calculations was investigated and that based on the results they would be able to do the calculations for the next submission with suggested Tier 2 EFs for the mentioned four types of crops.</p>					

	<b>Recommendation</b>
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	<b>The ERT recommends the Party to collect country-specific data for NMVOC needed for the Tier 2 methodology and to report NMVOC emissions from this source in the next submission.</b>
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## **PART C: SPECIFIC RECOMMENDATIONS FOR THE GRIDDED EMISSION DATA FOR THE SECTOR AGRICULTURE**

For the 2023 Review of the gridded emission data the focus was set on ammonia, NMVOC, NO<sub>x</sub> and PM<sub>2.5</sub> emissions.

11. The methods used by Latvia to grid sectoral emissions are described transparently in the IIR 2021 but not in the IIR 2023.

12. The description includes data sources that have been used for spatial distribution.

13. Gridded emissions reported for GNFR K\_AgriLivestock and L\_AgriOther are consistent with the corresponding NFR categories reported in Annex I.

14. There are no additional comments.

**REVISED ESTIMATES AND TECHNICAL  
CORRECTIONS CONSIDERED AND/OR  
CALCULATED BY ERT**

15. Latvia did not provide any Revised Estimates and the ERT did not identify any Potential Technical Corrections.

## **LIST OF MATERIALS PROVIDED TO ERT**

1. Latvia Annex I reporting template
2. Latvia Stage 2 S&A report
3. Latvia Stage 1 report 2023
4. Latvia IIR 2023
5. Repdab-Report
6. Report for the Stage 3 in-depth review of emission inventories submitted under the UNECE LRTAP Convention and EU NEC Directive for Latvia, September 2013

## **LIST OF ADDITIONAL MATERIALS PROVIDED BY THE COUNTRY DURING THE REVIEW**

1. Responses to the questions raised by ERT have been used in this report
2. No additional information was provided by Latvia either before or during the review.

## ABBREVIATIONS

This list includes abbreviations commonly used in the Review Reports

AD	Activity data
BaP	Benzo[a]pyrene
BC	Black Carbon
C	Confidential
Cd	Cadmium
CEIP	Centre on Emission Inventories and Projections
CLRTAP	Convention on Long-range Transboundary Air Pollution – ‘the Air Convention’
CO	Carbon Monoxide
E-PRTR	European Pollutant Release and Transfer Register
EEA	European Environment Agency
EF	Emission factor
EMEP	The co-operative programme for monitoring and evaluation of the long-range transmission of air pollutants in Europe (unofficially ‘European Monitoring and Evaluation Programme’ = EMEP)
ERC	Emission Reduction Commitment
ERT	Expert Review Team
GHG	Greenhouse gas
GIS	Geo Information System
GNFR	NFR Aggregation for Gridding and LPS
HCB	Hexachlorobenzene
Hg	Mercury
HM	Heavy metals
IEF	Implied emission factor
kt	Kilotonnes
LPS	Large Point Sources
NA	Not applicable
NE	Not Estimated
NECD	National Emission reduction Commitments Directive
NFR	Nomenclature for reporting
NH <sub>3</sub>	Ammonia
NMVOG	Non-methane volatile organic compounds
NO	Not Occuring
NO <sub>x</sub>	Nitrogen oxides
NR	Not relevant/Not Reported
PAHs	Polycyclic aromatic hydrocarbons
Pb	Lead
PCB	Polychlorinated biphenyls
PCDD/F	Polychlorinated dibenzo-p-dioxins and dibenzofurans
PM <sub>10</sub>	Fine particulate matter: particles with an aerodynamic diameter equal to or less than 10 micrometres (µm)

PM <sub>2.5</sub>	Fine particulate matter: particles with an aerodynamic diameter equal to or less than 2.5 micrometres (µm)
POPs	Persistent organic pollutants
PTC	Potential technical correction
RE	Revised estimate
SO <sub>2</sub>	Sulphur dioxide
SO <sub>x</sub>	Sulphur oxides
TC	Technical correction
TSP	Total suspended particulates



## LIST OF REFERENCES AND SUPPORTING DOCUMENTS

1. Annex I emission reporting template. Available at <https://www.ceip.at/reporting-instructions>
2. ECE/EB.AIR/111/Add.1: Decision 2012/3: Adjustments under the Gothenburg Protocol to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them  
[https://unece.org/DAM/env/documents/2013/air/ECE\\_EB.AIR\\_111\\_Add.1\\_ENG\\_DE\\_CISION\\_3.pdf](https://unece.org/DAM/env/documents/2013/air/ECE_EB.AIR_111_Add.1_ENG_DE_CISION_3.pdf)
3. ECE/EB.AIR/113/Add.1: Decision 2012/12: Guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them  
[https://unece.org/DAM/env/documents/2012/EB/Decision\\_2012\\_12.pdf](https://unece.org/DAM/env/documents/2012/EB/Decision_2012_12.pdf)
4. ECE/EB.AIR/125: 2014 Reporting Guidelines for Estimating and Reporting Emission Data under CLRTAP  
[https://unece.org/fileadmin/DAM/env/documents/2013/air/eb/ece.eb.air.125\\_E\\_ODS.pdf](https://unece.org/fileadmin/DAM/env/documents/2013/air/eb/ece.eb.air.125_E_ODS.pdf)
5. ECE/EB.AIR/127/Add.1: Decision 2014/1: Improving the guidance for adjustments under the 1999 Protocol to Abate Acidification, Eutrophication and Ground-level Ozone to emission reduction commitments or to inventories for the purposes of comparing total national emissions with them  
[https://unece.org/DAM/env/documents/2014/AIR/EB/Decision\\_2014\\_1.pdf](https://unece.org/DAM/env/documents/2014/AIR/EB/Decision_2014_1.pdf)
6. ECE/EB.AIR/130: Technical Guidance for Parties Making Adjustment Applications and for the Expert Review of Adjustment Applications, 14 April 2015  
[https://unece.org/DAM/env/documents/2014/AIR/EB/ECE\\_EB\\_AIR\\_130\\_ENG.pdf](https://unece.org/DAM/env/documents/2014/AIR/EB/ECE_EB_AIR_130_ENG.pdf)
7. [ECE/EB.AIR/142/Add.1: Decision 2018/1: Updated methods and procedures for the technical reviews of air pollutant emission inventories reported under the Convention](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2019/decision_2018_1_advance_version_ece_eb.air_142_add.1.pdf)  
[https://www.ceip.at/fileadmin/inhalte/ceip/00\\_pdf\\_other/2019/decision\\_2018\\_1\\_advance\\_version\\_ece\\_eb.air\\_142\\_add.1.pdf](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2019/decision_2018_1_advance_version_ece_eb.air_142_add.1.pdf)
8. EMEP/EEA: EMEP/EEA air pollutant emission inventory guidebook 2016, EEA Report No. 21/2016 European Environment Agency, Copenhagen. Available at: <http://www.eea.europa.eu/publications/emep-eea-guidebook-2016>
9. EMEP/EEA: EMEP/EEA air pollutant emission inventory guidebook 2019, EEA Report No. 13/2019 European Environment Agency, Copenhagen. Available at: <https://www.eea.europa.eu/publications/emep-eea-guidebook-2019>
10. TFEIP (2022): "Inventory adjustments in the context of emission reduction commitments (ERC)" available at: [https://www.ceip.at/fileadmin/inhalte/ceip/00\\_pdf\\_other/2022/technical\\_guidance\\_for\\_erc\\_adjustments\\_issue1.1.pdf](https://www.ceip.at/fileadmin/inhalte/ceip/00_pdf_other/2022/technical_guidance_for_erc_adjustments_issue1.1.pdf)